Net-Centric Fires for the Objective Force

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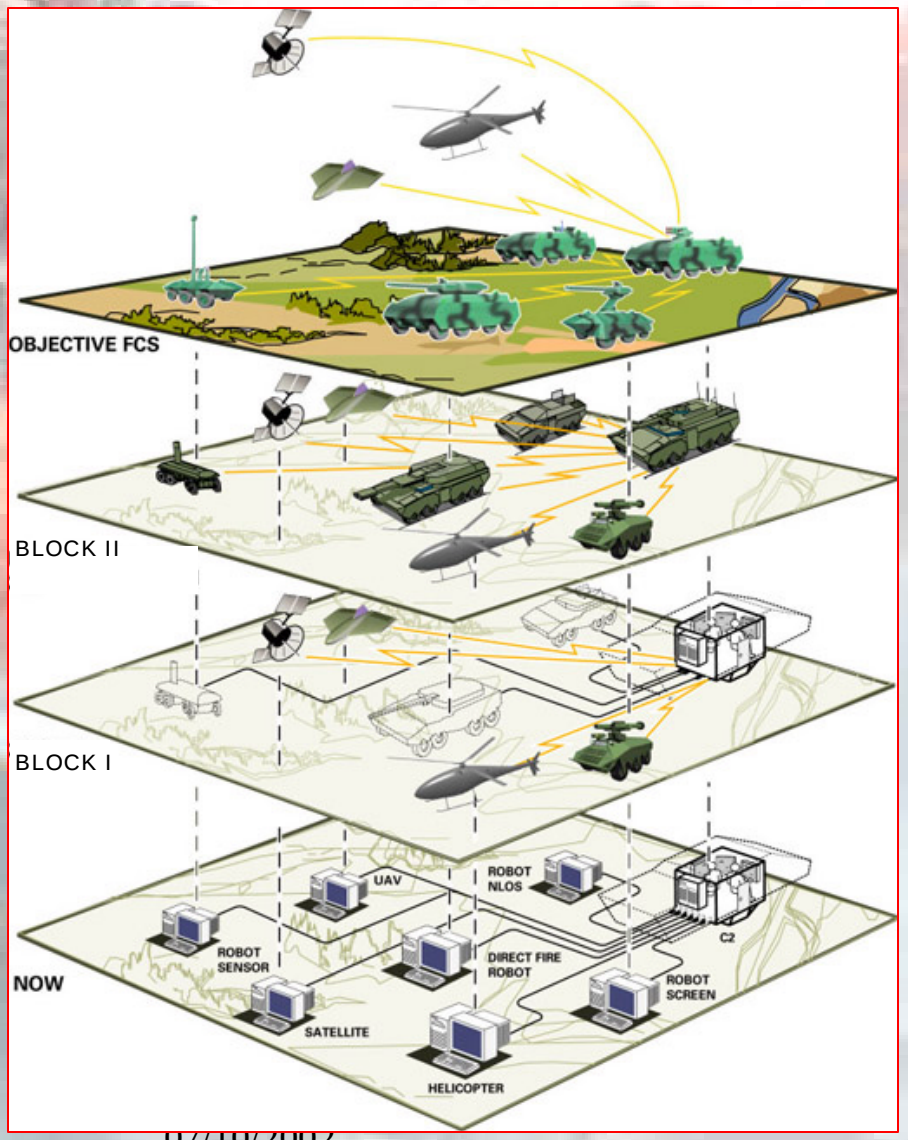
Agenda

- Net-Centric Fires Concept for the Objective Force
- Proposed Block I Demonstration
- TRL 5 and 6 Component Technologies
- Link of Demo to LSI BIAs
- Future Considerations
- DANTE Partnership Group
- Discussion

Net-Centric Fires Concept



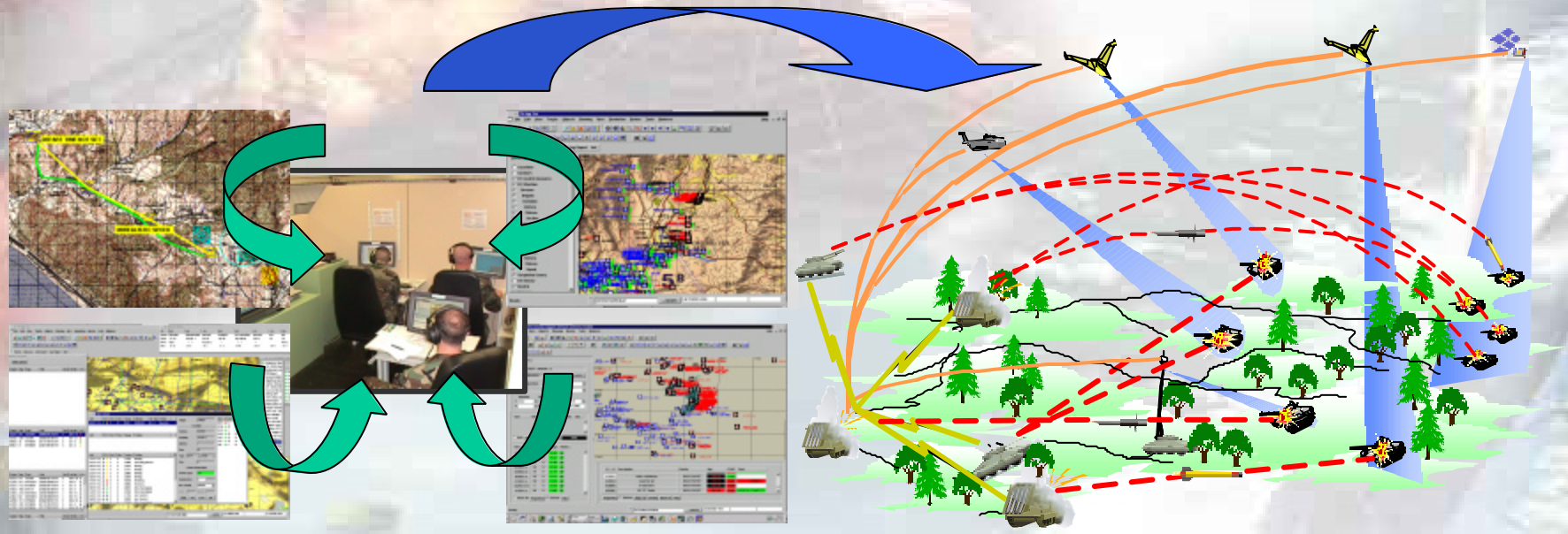
- Extrapolate today's weapon unique fire control to a Unit of Action Netted/Common Fire Control (tactical level)
  - ***Requires information fusion and combat decision aids***
  - ***Establishes common weapon/armament architecture***
- Follows a migration path from distributed simulation to the Objective Force
  - ***Scope – LOS, BLOS, NLOS for entire Family of Systems (FoS)***

Net-Centric Fires Concept (2)

- **Redefine stovepiped weapon/armament control paradigm…**
  - ***Advance beyond the "platform-centric" and "branch-centric" views of Fire Control***
  - ***Integrate C2 concepts into Netted Fire Control***
- **Achieve distributed processing technology tailored to the Unit of Action**
  - ***Approach notion of "grid-computing"***
- **Can only be achieved through the development and use of *common* requirements, architecture, and standards**

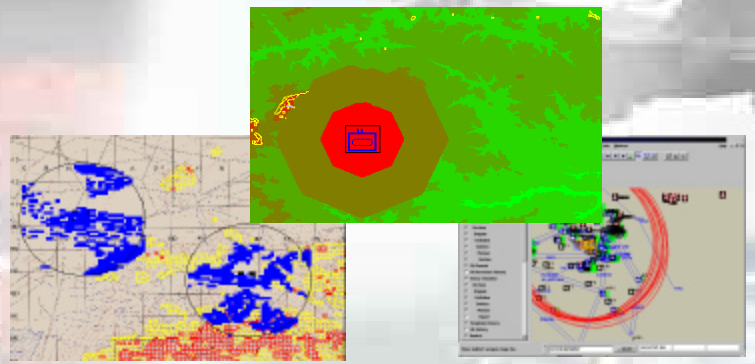
Combat Decision Aids System (CDAS)

A full spectrum, scalable decision support capability for the mounted warfighter to enhance capability to shoot, move, communicate, sustain and survive on the digital battlefield



Enables network centric, effects based fires…
Enhances lethality, survivability, mobility and agility…
Reduces software cost through common open architecture and component based assembly and reuse…

Combat Decision Aids System (1)

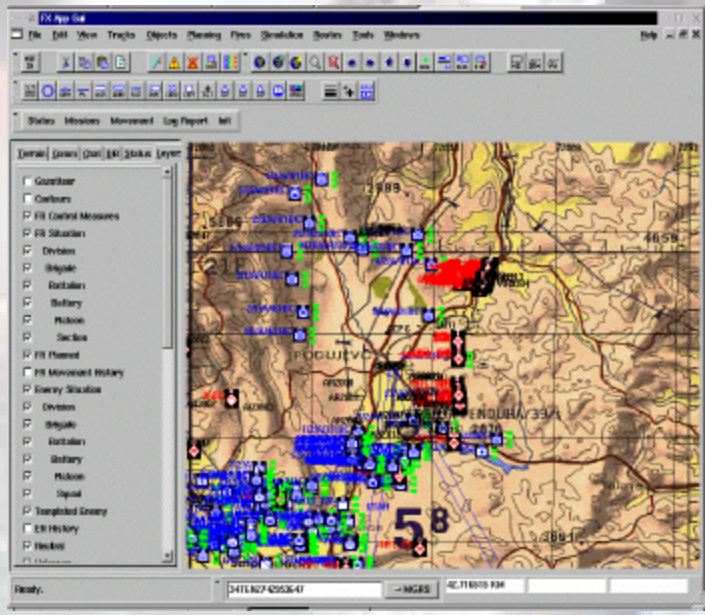


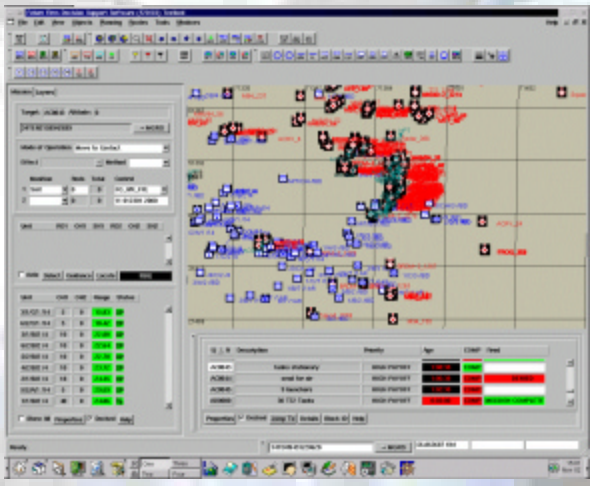
- **Terrain**
  - *Terrain Analysis and Categorization **
  - *Mobility Corridor Analysis **
  - *Route Planning **
  - *Weapons Line of Sight **
  - *Mobility Range Rings **
  - *ADRG, CADRG, VITD, DTED map products import and display*
- **Planning**
  - *Shared, synchronized databases for real-time collaborative map-based or whiteboard planning and collaborative mission execution*
  - *Shared message databases and chat capability*
  - *Computer-aided generation of NAIs and TAIs for Intel Preparation of the Battlefield*
  - *Autogeneration and update of Synchronization Matrix for Decision Support*
  - *Rapid, Graphical Plan Laydown*
  - *Static and Dynamic Plan Checking*
  - *MIL-STD-2525b Joint Tactical Symbology*
  - *Direct and Indirect Fire Weapons Range fans*

* **Validated against the USMC's DTAMS topographic engineering software in May 1999, and fielded in USMC's C2PC software in January 2000.**

Combat Decision Aids System (2)

- Situational Awareness
  - *Common Operational Picture*
  - *Near Real Time Alerting for Situational Awareness (Plan vs. Tactical Situation)*
  - *Self Defense Alerting*
  - *Point and click targeting*
  - *Total asset visibility of combat unit status*
  - *Filtering of tactical data view*
- Simulation
  - *Course of Action Animation*
  - *Slider Bar to Animate Current Course of Action*
  - *Interface to JCATS, JANUS, ModSAF/OTB and FIRESIM DIS simulation environments*





Net-Centric Fires for the Objective Force

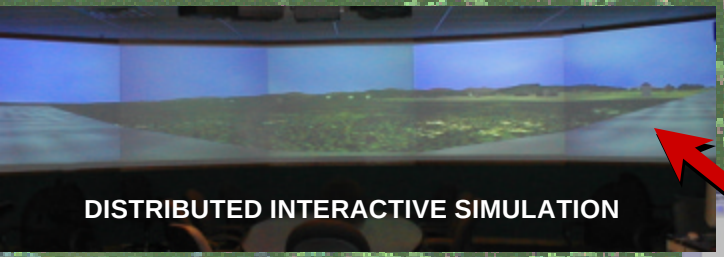
OBJECTIVE

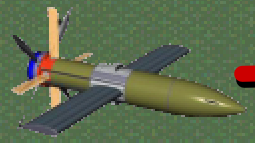
- Provide a System of Systems (SoS) concept for effective Net-Centric Fires for the Objective Force, leveraging a Collection of component technologies in support of the Boeing/SAIC LSI Team Capstone Exercise emphasizing…
  - ***Netted / Common Fire Control***
    - *Tactical (Netted) across FCS Unit of Action*
    - *Technical (Common) across all platforms*
  - ***Reconnaissance / Surveillance***

Block I DEMO Concept

- Demonstrate Net-Centric Fires-on-the-Move using available assets as Prototype and Surrogate vehicles over wireless LAN and Radio/DREN over multiple sites
- Concept instantiated as a Hardware-in-the-Loop Distributed Interactive Simulation (DIS)

Block I Demo – Insertion of TRL 5/6 Component Technologies...





- SUAV (Prototype)
  - *Quick Look (155mm or Simulation)*
- Scout Vehicle (Prototype)
  - *LAV-Recce (Canadian FAVS program)*
  - *Fully integrated sensor suite (e.g., radar, night vision, acoustic/seismic, hyperspectral, immersive visualization)*
  - *CDAS*

- C2 Control Vehicle (M577 Surrogate)
  - *CDAS (Full suite)*

- 155mm Artillery (M109A6 Surrogate)
  - *Embedded/Netted prognostics/diagnostics*
  - *Projectile Tracking & Guidance System*
  - *CDAS*

- 105mm Semi-Auto Turret (Prototype)
  - *Mobile Gun System Prototype*
  - *Automatic Target Recognition*
  - *Immersive Visualization*
  - *CDAS*
- 120mm Tank (M1A2 Surrogate)
  - *MRM Simulation*
  - *CDAS*

- Infantry Combat Vehicle (Prototype)
  - *LAV III (Canadian FAVS program)*
  - *Defensive Aids Suite (e.g., smoke, laser warning, combat ID)*
  - *Automatic Target Recognition*
  - *CDAS*

- 120mm Mortar (M1064 Surrogate)
  - *Common Fire Control (NATO BK)*
  - *CDAS*

- 120mm Semi-Auto Mortar (Hardstand)
  - *Common Fire Control (NATO BK)*
  - *CDAS*

- Forward Observer (Prototype)
  - *HMMWV (mounted)*
  - *CDAS – Light (dismounted)*

Component Technologies…

BLOCK I – TRL5 and below

- Component Technologies…
  - ***Combat Decision Aids System (CDAS)***
    - Fires Effects Cells
    - Tailored to all nodes within FCS
  - ***Family of NATO Ballistics Kernels***
    - Heart of the Common Fire Control architecture
  - ***Netted Prognostics/Diagnostics and Logistics***
    - Health monitor f/unit elements
  - ***Projectile Guidance and Tracking Systems (PGTS)***
    - Muzzle velocity, met data, auto registration, dynamic flight correction
  - ***Defensive Aids Suite***
    - Smoke, Laser Warning, Combat ID, UV missile detection
  - ***Automatic Target Recognition***
    - Visual wavelength, SAR
    - Hyperspectral
  - ***Surveillance Suite***
    - Integrated ground radar, visual/thermal, laser range finder, acoustic/seismic, hyperspectral

BLOCK II – TRL6 and above

- Emerging Technologies…
  - ***Immersive Visualization***
    - 360 degree panoramic view
    - "Transparent" armor
  - ***Novel man-machine interfaces***
    - Voice-activated commands, eye-tracking, natural language
  - ***Gearless Drives for Primary and Secondary armaments***
    - Shoot-on-the-move indirect fire
  - ***Netted/embedded training and rehearsal***
  - ***Tele-maintenance***
  - ***Defensive Aids Suite***
    - Active/Adaptive Protection
    - Laser Dazzling/Spoofing

Future Considerations…

- **FCS – OFW integration**
- **Interface with Air Defense**
- **Interface to Legacy/Development Systems**
- **Deriving/Influencing Requirements for Block II**
  - ***Network data rates, grid processing, etc…***
- **Use Distributed Interactive Simulation to evolve Doctrine for the Objective Force**
  - ***Wargaming, man-machine interfaces, etc…***

Who is DANTE?

The *DANTE Partnership Group* is a collaboration of US and Canadian Government and Industry partners specializing in technologies for Land Warfare Systems

- **D – DRDC**
  - ***Defence Research and Development Center (Canada)***
- **A – ARDEC + AAD**
  - ***Armaments R&D Center; Anniston Army Depot (TACOM)***
- **N – NVL**
  - ***Night Vision Labs (CECOM)***
- **T – TARDEC**
  - ***Tank-Automotive R&D Center (TACOM)***
- **E – Enterprise Associates**
  - ***High Performance Technology inc, Northrup-Grumman IT, General Dynamics Canada, General Motors Defense, etc.***